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The supernova remnant SN 1006 as a Galactic particle accelerator

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HONEST
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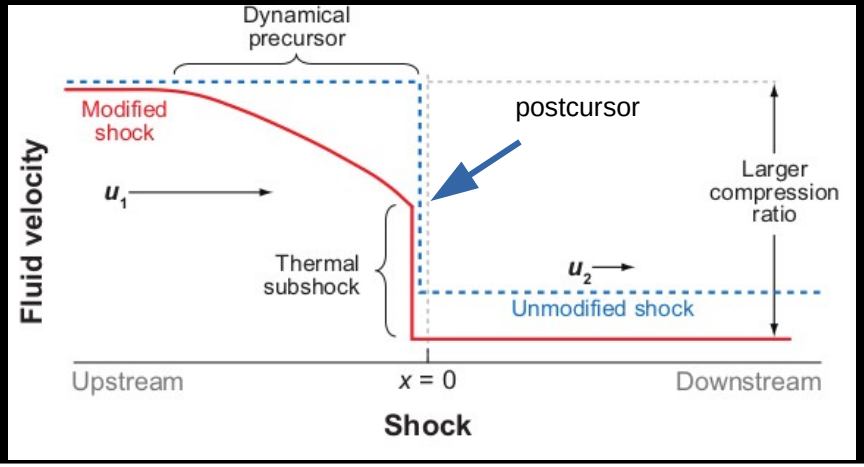
INTRODUCTION

Rate of SNe in the Milky Way ~ 2.5/century

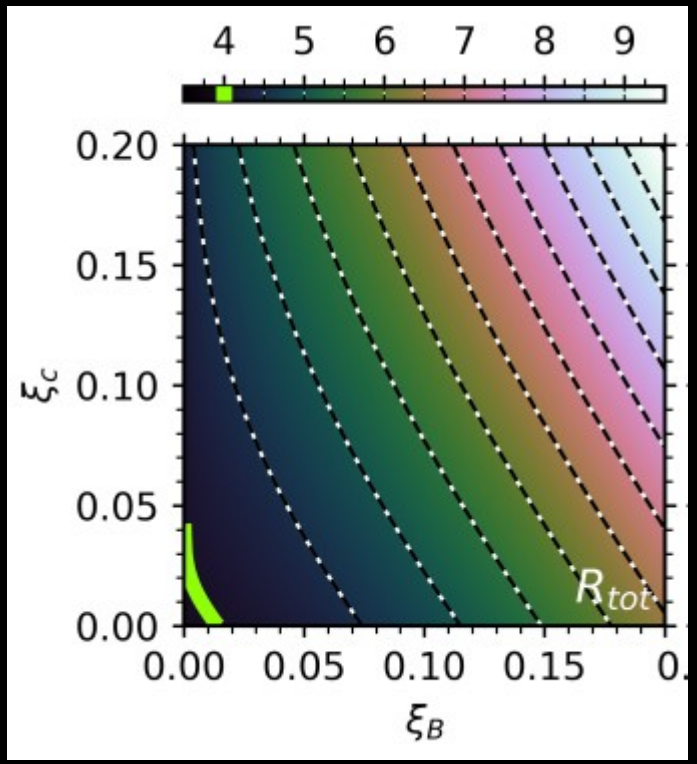
$E_{explosion} = 10^{51}$ erg

Required power to accelerate cosmic-rays = 2×10^{50} erg/century

SNRs are the only galactic sources that can provide the required power to CRs, yielding them ~ 10% of their kinetic energy



Haggerty & Caprioli 2020

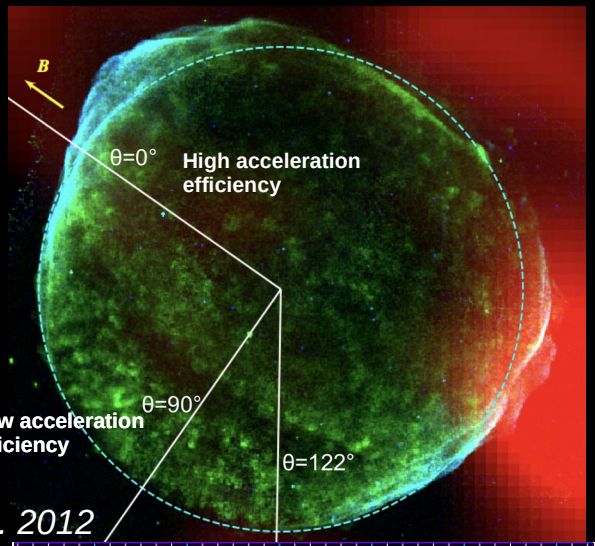


$\rho_2 / \rho_1 > 4$ → Shock modification

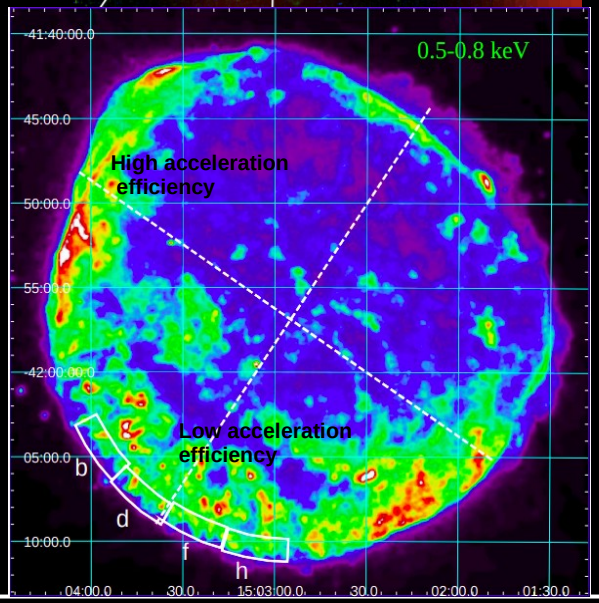
Drury et al. 1983, Decourchelle et al. 2000, Blasi et al. 2002, Vink et al. 2010

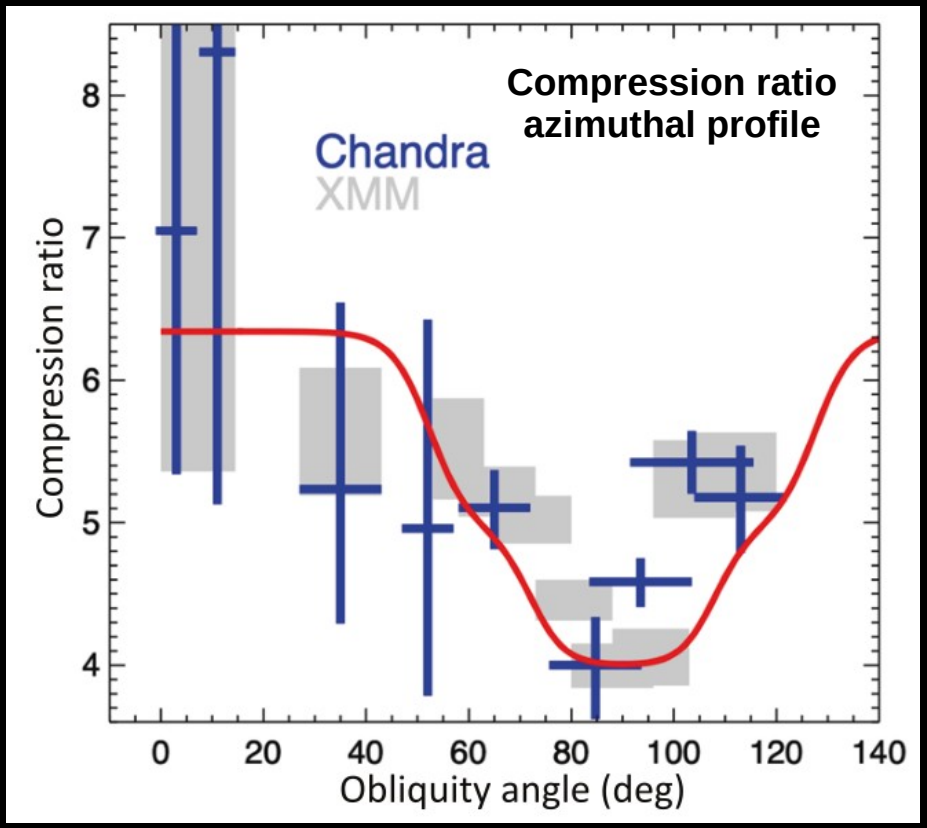
PARTICLE ACCELERATION IN SN 1006

Giuffrida et al. 2022 (Nature Communications, Volume 13, article id. 5098)



Miceli et al. 2012





Caprioli et al. 2014, Caprioli et al. 2018, Haggerty & Caprioli 2020, Caprioli et al. 2020

Particle acceleration causes shock modification.
SN 1006 is tranferring part of its kinetic energy to accelerate hadrons.